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A Factor-Analytic Study of Respondent Variability in Demographic Data

Introduction

ALTHOUGH many concepts involved in demographic measurement such as "age", "age at marriage", "number of pregnancies" are coa-create and apparently more unambiguous than concepts such as "current pregnancy status", "age at consummation of marriage", "ideal age of marriage", etc., they too are not entirely free from response errors. Our recent studies of test-retest reliability and response inconsistency of survey data show that excepting the number of pregnancies, none of these variables have a retest reliability higher than 0.872 when the time interval between original interview and reinterview was approximately five months. There is a strong possibility of a wide range of individual response inconsistency even in factual data. Thus, there can be a good deal of disagreement after a lapse of time between two answers even though these responses are provided by the same individual to the same demographic question of factual nature (Ryder and Westoff, 1971 ; Seltzer, 1973, p. 3), For example, we found the percentage of agreement after a lapse of nearly five months to be only 58.1 so far as the number of male children in the household is concerned. For the same group of respondents, the percentage of agreement on respondents' educational status turned out to be 81.2. Such inaccuracies on the part of the respondents, with regard to their responses to a single question, are of considerable consequences in any type of demographic analysis whether it be for ascertaining the age-related correlates of fertility or for cross-classification of age data. Obviously, if the obtained responses to a question were determined entirely by chance there would be no hope in finding a single variable which would correlate significantly with it.

The Concept of Respondent Variability

In addition to errors in coding and data processing operations which can be controlled, attempts have been made in the past to explain response inconsistencies in terms of sources like *(a)* interviewing style, *(b)* situational factors such as the presence of others during the interview, the degree of respondents' motivation and willingness to cooperate, (c) defect in the instrument used for testing or interviewing, and *(d)* in respondent's tendency to be inconsistent (respondent variability).

In the present paper we deal specifically with the respondent variability with regard to responses to a single question, i.e. a respondent's tendency to offer different response than he would when the same content (single-item question) is presented in the same form on a different occasion. The discrepancy between responses offered on different occasions is used for estimating response variance. It is often impractical in surveys to make more than one or two observations of a respondent. Hence, the amount of error cannot be found in the same way as is usually done in physics or chemistry. This difficulty is minimised by taking a pair of observations on a particular variable on a large number of individuals, say 100 or more. Average discrepancy of these observations could be taken as an index of error but it is better to compute the product moment correlations, or other measures of association, between the two sets of observations. The correlation between the two comparable sets yields the test retest reliability. The closer the reliability coefficient to unity, the more accurate is the observation.

Respondent Variability and Non-Sampling Errors

Since the accuracy of survey results is affected both by sampling and non-sampling errors, and respondent variability is an important source of non-sampling errors, its measurement and control are very necessary in a sample survey. Statistical prediction of fertility behaviour would be more uncertain if the incidence of respondent variability is not minimized.

Respondent variability may be estimated from the post-survey unitary check (Murthy, 1967, p. 470) which consists in first matching, in respect of a selected variable, data from two enumerations for respondents covered by the check-sample (resurvey) and then computing for each respondent the intra-individual difference or test-retest discrepancy. Analysis of such discrepancy scores provides information on both net error and gross error. The net error, the average of the relative test-retest discrepancies over all respondents covered by the check-sample, can be considered to be a measure of the non-sampling bias connected with the particular variable in question. The gross error, on the other hand, being the average of the absolute positive and negative discrepancies, can give an idea about the non-sampling variance when sample size is fairly large, since it is essentially a mean deviation. If it is desired to derive a single index for estimating the non-sampling variance of p number of variables (P>1) on the basis of their gross error rates, the assumption of a constant value in each of the $(p^2 - p)/2$ intercorrelations among the response errors may be required for deriving simple formulae for estimation.

Systematic Response Errors

However, most survey results show that response errors are neither entirely random nor unrelated to each other. They are exceptionally stable and systematic (Des Raj, 1968, p. 177). The response errors are likely to be related to each other, though not necessarily in the same magnitude, as when the same individual responds to p number of logically independent questions on the same occasion. An obvious example is a sequence of questions in which subsequent responses depend on some previous ones. Certain response biases are systematic because the respondent in question consistently over-estimates or under-estimates the true value of the data sought from him. If respondents are prone to report a value which is substantially either higher or lower than the one given on the first time, such response biases produce systematic errors. Neter and Waksberg (1961) have shown in their study of variability in home owners' report of expenditures for home repairs and alternations, that respondent biases, when systematic may not cancel out completely at the survey estimate phase.

Response Sets

Nearly all survey data are likely to reveal some intra-individual-variability and inconsistency in response which cannot be attributed to interviewer or data processing operations. Besides imprecise measurement techniques, they arise from several reasons associated with the respondent: simple forgetting, overlooking a point, random guessing, or even unconscious suppression or rationalization on his part. When the respondent tends to be consistently inconsistent, then such a response set[1] (Cronbach, 1946 ; 1950) will cause systematic and correlated response errors. On the other hand, there might be also a tendency on the part of the respondent to give uniform responses even though a change in his response could be expected due to passage of time, as for example, in reporting his or her age after a year. Such consistent respondent errors (Marks and Mauldin, 1950) frequently arising from the carry over of the experience of first interview to second interview ("conditioning" effect, Des Raj, 1968, p. 185) will not only contribute to systematic element in the error component but will also increase the intercorrelations among response bias associated with different variables. Knowledge about the nature and sources of this type of systematic response bias can be accumulated only from a great deal of empirical research in this field.

Objectives of the Present Study

The specific question here is whether the disposition to respond consistently or inconsistently from time to time is a generalized tendency or a transient 'response set' of response errors, not reflecting a certain stable personality style of the respondent. We examine interrelationships among eight response inconsistency scores obtained from factual demographic

1. A response set may be broadly defined as a factor, other than the content of the guestion, influencing a respondent's answer. This could be the respondent's tendency of dissimulation, acquiescence, social desirability, verbosity, evasiveness or extremity. The term "set" is used in such a context to mean the criteria according to which a respondent evaluates the content of the question when selecting his answer (Rorer, 1965). Response style, on the other hand, refers to the way or manner of responding, such as a tendency to select some particular response option independently of the question content, (Couch and Keniston, 1960). Though the above types of response biases may be among the most fre quently encountered in survey data, these by no means exhaust the potential sources of non-sampling errors (Hansen, *et al;* 1953 ; Des Raj, 1968 ; Murthy, 1967).

data and seek to determine, by Guttman scalogram analysis, whether they reflect a single dimension reflecting a generalized tendency to be inconsistent. The relative test-retest discrepancy scores on the same eight demographic variables were intercorrelated, by factor analysis to determine (i) if one could retain the hypothesis that all these eight measures can be regarded as operationally representing a single concept (uni-dimensional)[2] and, *(ii)* if this generality hypothesis is rejected, the number and nature of dimensions reliably assessed by these measures.

Method

Sampling Procedure

The sample was drawn from records maintained in connection with a statewide Family Planning and Fertility Survey on approximately 3,000 respondent from 41 villages of Haryana. From the respondents originally interviewed during the period from August to November, 1971, about 9 per cent were randomly chosen for the reliability study. A plan was made to interview them again during January—February 1972. Although a total of 272 reinterviews were planned, only 160 could be completed. A large number of selected respondents could not be located in the second round of the survey (resurvey) because some of them had "moved from the villages", some were "visiting relatives" and some were busy in working on their farms. Quite a few respondents were not available even after the third call-back. There was no provision for "substitution", and so the sample size was not extended beyond the 160 cases. The present analysis is based on the data provided by these respondents, of whom 79 were males and 81, females.

Background Characteristics of Respondents

According to the data of the first interview the mean age of the male respondents was 33.08 years and of the female respondents, 29.67 years.

2. Any set of measures which is unidimensional would have to be composed of items (indices or questions) which are homogeneous, in respect to the attribute (hereresponse variability). If the component items (here, eight test-retest discrepancy measures) are not homogeneous, some items would be then measuring attributes not measured by others and additional dimensions would be thus required.

For both males and females, there was a difference of slightly more than two years between their marriage and the consummation of the marriage. The mean age of marriage for the female respondents was nearly 13 years and for the male respondents, nearly 18.5 years. The mean age at consummation for the female and male respondents were 15.48 and 20.48 years respectively.

Almost 28 per cent of the respondents were literates ; the percentage of literacy for males was around 42. About 63 per cent of the respondents were living in joint families. Only 20 of 81 female respondents were working outside the home. Among male respondents, only two were unemployed. Only 32 of the 160 respondents were practising family planning at the time of first interview.

Interview Schedule and Interviewing

A pre-coded interview schedule was used for collecting information on the respondent's demographic characteristics, marriage, pregnancy history, and family planning knowledge, attitude and practice. The interview schedule used in the resurvey was identical to the one used in the first interview. The interview was conducted more or less in the same manner as the original interview, the only exception being that each respondent was given the reason for the re-interview for securing their cooperation. It may be mentioned also that most respondents had re-interviewers different from their interviewers in the first survey, and that the re-interviewer had no opportunity of perusing the original interview returns.

Type of Data Used

In the resurvey, test-retest data on the following eight demographic variables were collected : *(a)* Respondent's educational status, *(b)* the educational level of respondent's spouse, (c) number of pregnancies experienced by the respondent or respondent's wife, *(d)* number of female children in the household, *(e)* number of male children in the household, (*f*) respondent's age at consummation of marriage, *(g)* age at marriage, and *(h)* respondent's age.

Two types of scores were obtained for each respondent from each of the eight demographic variables, namely, response inconsistency score and the relative test-retest discrepancy score. For each variable, the respondent received a score of one for being consistent in both the interview sessions and a zero score for giving a reply different from the one provided in the original interview. Thus, the response inconsistency scores on each of the eight variables were dichotomous in nature.

The test-retest discrepancy score was obtained for each variable by subtracting the value recorded for the second interview with the corresponding value recorded originally. Such relative discrepancy scores were obtained with respect to each of the above-mentioned eight variables for each of the 160 respondents.

Statistical Analysis

The generality hypothesis was tested first by determining whether or not the response inconsistency scores formed a unidimensional scale. It was assumed that if the response inconsistency scores were highly scalable in the Guttman sense, they would reflect a generalized tendency[3]. If they were scalable in one dimension, respondents with the same total inconsistency scores would have about the same level of generalised tendency to respond differentially on two occasions. If response inconsistency scores were not scalable, the recorded observations on a number of variables *cannot* be summarized by a single inconsistency score.

To determine whether there existed at least one common factor underlying respondent variability, the product moment intercorrelations among the eight relative test-retest discrepancy measures were first tested for their statistical significance. If this test indicated the answer to be affirmative, one could proceed to test the generality hypothesis by calculating the loadings of each variable on the first principal component (Harman, 1967).

If, in the process, the unidimensional hypothesis is rejected by zero loadings, a multifactor hypothesis could be explored by use of the methods of principal axes factor extractions with communality estimates in the diagonal of the intercorrelation matrix (Harman, 1967).

3. While it appears to be true that a Guttman Scale with a high reproductivity coefficient will tend to measure a single factor, not all unidimensional scales will be highly reproducible.

Results

Scalability of Response Inconsistency Scores

The dichotomous responses on the eight inconsistency items did not form a "true scale", as the coefficient of reproducibility

$$\left(1 - \frac{\text{Sum of Errors}}{N_p} \right)$$

was 0.7641, as against 0.90 which Guttman (1950) uses as one criterion of scalability. It was quite close to the minimum marginal reproducibility of 0.7148 that could have occurred for the scale, given the cutting points used (here 1 for each dichotomously scored items) and the proportion of respondents being inconsistent in each item. Jackson's (1949) Plus Percentage Ratio (PPR)[4] for the data turned out to be 0.1726 which should be well above 0.60 if the scale is truly unidimensional and cumulative. Thus, in terms of both reproducibility and PPR, the set of eight response inconsistency scores under study cannot be considered scalable. Since the extent to which a given series of items departs from the unidimensionabi-lity hypothesis is generally expressed by the coefficient of reproducibility, the evidence in favour of a single response inconsistency tendency is pretty weak for the data of the present study.

From Table 1 it will be seen that a high proportion of respondents (above 80%) responded consistently in both the interview sessions with respect to only first two out of eight items. Two respondents of the 160 respondents did not show a single consistency in responding to the eight items while another two showed as many as seven consistencies.

It will be seen from the right marginals (last but one column of this table) that the most common pattern is the inconsistency responses in the first four items and consistency responses in the last four items (fourth of

4. The Plus Percentage Ratio (PPR) which ranges from 0 to 1 is obtained by dividing the per cent improvement by the difference between 1 and the minimum marginal reproducibility (MMR). The numerator of the MMR is given by the sum of number of rights (consistent) or wrong responses in each column (item) whichever is larger. The denominator is given by the N_p where N = sample size and p = number of items.

TABLE 1— INCONSISTENT RESPONSE PATTRENS* OF 160 INDIVIDUALS RECORDED FOR EIGHT DEMO-GRAPHIC ITEMS WHERE ROWS AND COLUMNS ARE ORDERD FOR GUTTMAN SCALING

Scale Type	ideal Response Pattern	*Name and Serial Number of Inconsistency Item* 6 Consummation Age -	+	7 Marriage Age -	+	8 Age -	+	5 Male Child -	+	4 Female Child -	+	3 Pregnancy -	+	2 Spouse Education -	+	1 Respondents Education -	+	Possible No. of Respondent	No. of departures (Errors) from the Scale type
8	+ + + + + + + + +	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
7	- + + + + + + + +	1	2**	0	3	*1*	2	0	3	*1*	2	7	2	0	3	0	3	3	4
6	- - + + + + + + +	10	9	12	7	*7*	12	*3*	16	*2*	17	*2*	17	/	18	/	18	19	32
5	- - - + + + + + +	26	*10*	23	*13*	28	*8*	*10*	26	*6*	30	*7*	29	5	31	*3*	33	36	62
4	- - - - + + + + +	41	*7*	41	*7*	40	*8*	14	*34*	*18*	30	*19*	29	*11*	37	*8*	40	48	112
3	- - - - - + + + +	29	*1*	27	*3*	24	*6*	20	*10*	18	*12*	*15*	15	*6*	24	*11*	19	30	64
2	- - - - - - + +	14	*2*	16	*0*	16	0	13	*3*	12	*4*	13	*3*	*9*	7	*3*	13	16	24
1	- - - - - - - +	6	0	6	0	6	0	5	*1*	6	0	6	0	5	/	*2*	4	6	4
0	- - - - - - - - -	2	0	2	0	2	0	2	0	2	0	2	0	2	0	*2*	0	2	0
Sums		129	31	127	33	124	36	67	93	65	95	64	96	39	121	30	130	160	302
Percent		81	19	79	21	78	22	42	58	41	59	40	60	24	76	19	81	100	
Errors (E)		0	31	0	?0	8	22	13	48	27	16	43	3	32	1	28	0	302	

Coeff. of Reproducibility $= 1 - \frac{302}{160 \times 8} = 1 - .2359 = 0.7641$

Minimum Marginal Reproducibility $= \frac{129 + 127 + 124 + 93 + 95 + 96 + 121 + 130}{(160)\ (8)} = 07.148$

Proportion of Improvement $= 0.0493$

Jackson plus Percentage Ratio $= \frac{0.0493}{1 - .7148} = 0.1726$

*Rights are listed under plus sign (consistent), wrongs are listed under dash sign (inconsistent).

**Numerals which are italicized show the Guttman error count, i.e. frequency of respondents making a departure from the ideal response pattern (Scale type).

the possible nine scale types), comprising exactly 30 per cent of the respondents. However, this ideal scale type showed the (highest number of errors. The total number of error-counts for the fourth scale type is 112.

Intercorrelations among Response Inconsistency Scores

The intercorrelations among the eight dichotomously scored inconsistency measures, in terms of values of Yule's *Q* coefficient are given in Table 2, alongwith the mean and standard deviation of each inconsistency score and the index of inconsistency for each variable.

Excepting the correlation (association) between number of male children and number of female children in the household, all the *Q* coefficients are pretty low. The coefficients do not conform to the "diagonal-ridge" pattern, in which the correlation, largest next to the principal diagonal tapers off in each direction. Such a pattern, called 'simplex', is an obvious consequence when the items are ordered on a unidimensional Guttman Scale. It can indeed be inferred from the mere inspection of the intercorrelations that the various inconsistency responses do not form a satisfactory Gutt man-type cumulative scale.

Intercorrelations among Discrepancy Scores

Product-moment intercorrelations among the eight discrepancy scores are reported in the lower diagonal of Table 3, together with the mean and standard deviation of each score and the loading of each of the discrepancy variables on the first principal component. The residual correlations after the extraction of the first principal component are shown in the upper diagonal of Table 3.

Examination of the intercorrelations reveals that six out of the 28 intercorrelations were statistically significant at the .01 level (one-tailed test). Application of Barlett's (1950) sphericity test to the data using 0.2950691 as the value of the determinant of the intercorrelation matrix shows that the value of chi-square turns out to be

$$\begin{aligned}\chi^2 &= -\left[(N-1)-\frac{1}{6}(2p+5)\right]\log_e |R| \\ &= -\left[159-\frac{21}{6}\right]\log_e 0.2950691 \\ &= -(155.5)(-1.2206) \\ &= 189.8\end{aligned}$$

TABLE 2-YULE'S Q COEFFICIENTS OF ASSOCIATIONS AMONG EIGHT DICHOTOMOUSLY SCORED INCONSISTENCY ITEMS

Item No.	*Inconsistency in the Reporting of*	*Serial Number of the Discrepancy Item*							
		1	2	*3*	*4*	5	*6*	*7*	*8*
1.	Resp. Education	-	0.1765	0.0001	0.0685	-0.2193	0.2603	-0.0980	-0.0291
2.	Spouse's Education	0.1765	-	0.3582	00805	0.3109	-0.0474	-0.2774	-0.0217
3.	No. of Pregnancies	0.0001	03582	-	0.2119	0.1169	0.0235	0.2596	0.0300
4.	No. of Female Children	0.0685	0.0805	0.2119	-	0.5642	-0.3441	-0.1241	0.1977
5.	No. of Male Children	-0.2193	0.3109	0.1169	0.5642	-	-0.626	-0.0917	-0.0676
6.	Age at Consummation	0.2603	-0 0474	0.0335	-0.3441	-0.1626	-	0.7051	0.1129
7.	Age at Marriage	-0.0980	-0.2774	0.2596	-0.1241	-00917	0.7051	-	0.2562
8.	Respondent's Age	-0.0291	-0.0217	0.0300	0.1977	-0 0676	0.1129	0.2562	-
Mean *(q)* *		0.19	0.24	0.40	0.41	0.42	0.81	0.79	0.78
Standard Deviation (*pq*)		0.3923	0.4271	0.4899	0.4918	0.4936	03923	0.4073	04142
Index of Inconsistency**		0.3263	0.4009	0.333	0.4 L60	0.4164	0.5178	0.4231	0.4726

*The statistics shown in this row for different items refers to the mean of the inconsistency scores on each item Since it is a proportion, it actually indicates the relative frequency of respondents who were inconsistent on that particular item THE proportion also gives an estimate of the gross response error.

**The index of individual inconsistency proposed by Ryder and Westoff (1971, p. 360) reflects essentially the proportion of respondents apparently giving a random answer to a single question. vpummi or

TABLE 3-PRODUCT-MOMENT INTERCORRELATIONS AMONG EIGHT TEST-RETEST DISCREPANCY SCORES (BELOW DIAGONAL) AND RESIDUAL CORRELATIONS AFTER EXTRACTION OF FIRST PRINCIPAL COMPONENT (DIAGONAL AND ABOVE DIAGONAL) ALONG WITH THEIR MEAN, STANDARD DEVIATION AND LOADINGS ON THE FIRST PRINCIPAL COMPONENT (N=160)

S, Relative No. Discrepancy Score on	*Serial Number of Test-Re test Discrepancy Score ($X_2 — X_1$)*							*Discrep. Score*			
	1	2	*3*	*4*	5	*6*	7	*8*	r_{tt} @	*Mean*	*S.D.*
1. Respondent's Education	0.967	0.025	-0.109	0.064	0.075	0.075	0.117	-0.049	0.947	0.037	0.662
2. Spouse's Education	0.049	0.983	0.050	-0.076	0.112	0.047	0.105	0.057	0.918	-0.094	1.069
3. No. of Pregnancies	-0.059	0.086	0.925	0.007	0.114	0.049	0.054	0.262	0.932	0.194	1.157
4. No. of Female Child	0.022	-0.107	-0.057	0.946	0.205	-0.096	-0.041	-0.170	0.780	-0.137	1.210
5. No. of Male Child	0.075	-0.112	0.114	0.205**	1.000	0.027	0.042	-0.142	0.776	-0.025	1.279
6. Age at Consummation	-0.096	-0.071	-0.195**	0-112	0.027	0.206	-0.051	-0.149	0.732	-0.131	2.982
7. Age at Marriage	-0.043	-0.012	-0.188**	0.165	0.042	0.736	0.220	-0.160	0.773	-0.313	3.333
8. Respondent's Age	-0.151	-0.017	0.108	-0.039	-0.142	0.351	0.335*	0.685	0.872	1.100	4.744
Loadings on First Principal Component	-0.181	-0.132	-0.274	0.233	0.000	0.891	0.883	0.561	-	-	-

*Statistically significant from a zero correlation at the .01 level (two-tailed). **Statistically significant from a zero correlation at the .05 level (two-tailed test). @ R_{TT} refers to the test-retest reliability of the original variables (X_1) after an interval of nearly five months.

where log_e is the natural logarithm and $|R|$ refers to the determinant of the intereorrelation matrix (Fruchter, 1954, p. 21) and the degrees of free-dom associated with the chi-square is given by

$$\mathrm{df} = \frac{1}{2}(p^2 - p) = 28.$$

Since X^2 of 189.8 with 28 degrees of freedom is statistically significant beyond the .001 level, the null hypothesis of zero intercorrelations. can be safely rejected. As such it would be reasonable to proceed further to account for the relations among, the eight variables,

Principal Component Analysis

Calculation of the first principal component loadings reveals that the requirements of the unifactor model are not satisfied by the pattern of intercorrelations. The residual correlations indicate that more than one factor is necessary to account for the common variance, as represented by the intereorrelations. The first principal component accounts for only 25.9 per cent of the total variance. The internal consistency reliability of the first principal component turned out to be 0.594. This multivariate analogue of the general weighted Kuder-Richardson reliability coefficient also suggests that the eight discrepancy scores are not highly homogene' ous with regard to their involvement with the first principal component Thus, the generality hypothesis seems to be untenable.

Factor Analysis of Test-Retest Discrepancy Scores

Since the hypothesis of one factor (unidimensionality) could not be retained, a multiple-factor hypothesis was explored by use of the methods of principal axes factor extractions with squared multiple correlations as the initial communality estimates using the electronic digital computer IBM 360/44. The factor analysis programme of the Statistical Package for the Social Sciences (SPSS) written by Nie, Bent and Hull was used for the purpose. The PA-2 option of the programme first calculates the squared multiple correlation (SMC) between each variable and the remaining $(p - 1)$ variables of the non-singular intereorrelation matrix, R, and uses these SMC values as the initial communality estimates. As shown by Dwyer (1939) and Guttman (1954), the SMC is the lower bound of the true communality and a measure of the predictable common variance among the observed correlations (Harman, 1967). Its use enables the analysis of the minimum number of common factors necessary to account for the observed intercorrelations.

The computer programme employed an iterative procedure for improving the communality estimates. Following the steps of principal component factorization it first determined the number of components (factors) to be extracted from the original or unreduced correlation matrix, *R*. Then it extracted the same number of factors from the reduced correlation matrix *R** wherein instead of unity, the SMC values were placed in the principal diagonal. The sum of independent common variance explained by each variable became its new communality estimates. Refactorization was done after replacing the diagonal values by these new communality estimates. This iterative process was continued until the differences in the two successive sets of communality estimates became negligible.

All principal factors were extracted after the converged communality estimates were inserted in the diagonal of the intercorrelation matrix. The latent (eigen) root of the fifth factor proved to be less than unity, while that of the fourth factor was 1.02. Thus, four of the eigenvalues were greater than unity. Hence, following the proofs and arguments advanced by Guttman, Kaiser, and Tryon (Harman, 1967) and more recently by Horn (1969), it was estimated that four common factors could be reliably determined and retained for subsequent interpretation. These four common factors accounted in combination for 40.20 per cent of the total variance.

Results of Factor Analysis

The loadings on the first four principal axes are shown in Table 4 along with the obtained communalities (h^2) and squared multiple correlation (SMC) for each variable. These results too show that the first principal factor cannot be identified as a generalized tendency for response inconsistency. The first two variables and the fifth variable have almost a zero loading on the first principal factor whereas the third variable (number of pregnancies) shows a negative loading of -0.23. The first factor involves all of the age related discrepancies and accounts for 53.1 per cent of the common variance. As such, it may be interpreted as a tendency to report discrepant age-related data rather than a general tendency to be discrepant. The generality hypothesis is also not supported by the SMG values.

TABLE 4-PRINCIPAL AXIS FACTOR MATRIX ALONG WITH OBTAINED COMMUNALITY *(h*)* and SMC VALUES FOR EACH DISCREPANCY MEASURE

S. No.	*Test-Retest Relative Discrepancy Measure*	*Principal Axis Factors*				h^2 *(Obtained Communality)*	*SMC (Initial Communa-lity)*
		I	*11*	*III*	*IV*		
1.	Respondent's Education Discrepancy	-0.101	0.170	0.092	0.187	0.082	0.038
2.	Spouse's Education Discrepancy	—0.018	-0.230	0.005	0.436	0.249	0.041
3.	Number of Pregnancies Discrepancy	-0.229	—0.189	—0.624	0.063	0.481	0.120
4.	No. of Female Child Discrepancy	0.151	0.327	-0.067	-0.036	0.136	0.080
5.	No. of Male Child Discrepancy	0.004	0.562	-0,347	O.C42	0.438	0.106
6.	Age at Consummation Discrepancy	0.827	0.014	—0.008	-0.014	0.684	0.566
7.	Age at Marriage Discrepancy	0.891	0.061	-0.020	0.168	0.827	0.565
8.	Respondent's Age Discrepancy	0.426	-0.381	-0.227	-0.154	0.402	0,216
Percent Common Variance		53.1	20.9	17.4	8.6	100.0	—
Percent Total Variance		21.9	8.6	7.2	3.5	40.2	—
Eigen Root		1.751	0,689	0.574	0.285	3.299	—

Further, the factors were rotated to the oblimin criterion of oblique simple structure (Harman, 1967, p. 334) with a delta parameter set at zero, essentially fulfiling the quartmin criterion. The rotated solution was obtained in a system of primary axes only when the direct oblimin criterion showed convergence after 25 iterations. The results of this quartimin rotations are presented in Table 5.

The primary factor structure matrix gives the correlation of each discrepancy variable with each pattern. The values for different variables

TABLE 5—OBLIQUE FACTOR PATTERN AND OBLIQUE FACTOR STRUCTURE MATRICES*

S. No.	Discrepancy Measure	*Primary Factor Pattern*				*Primary Factor Structure*			
		A	*B*	*C*	*D*	*A'*	*B'*	*C'*	*D'*
		Age	*Children*	*Pregnan.*	*Educ.*	*Age*	*Children*	*Pregnan.*	*Educ.*
I.	Respondent's Education	-0.080	0.130	-0.114	0.176	-0.130	0.151	-9.151	0.193
2.	Spouse's Education	-0.069	-0.136	0.096	-0.477	-0.045	0.176	0096	0.459
3.	No. of Pregnancies	-0.108	0.134	0.696	0.082	-0.141	-0.008	0.664	0.064
4.	Female Child	0.108	0.326	-0.051	-0.079	0.112	0.334	-0,115	-0.114
5.	Male Child	-0.008	0.673	0.178	-0.027	-0.036	0.638	0.040	-0.059
6.	Age at Consummation	0.809	0.072	-0.107	-0.033	0.815	0.055	-0.127	-0.232
7.	Age at Marriage	0.918	0,155	-0.108	0.149	0.874	0.126	-0.157	-0.081
8.	Respondent's Age	0.451	-0.221	0.265	-0.127	0.492	-0.295	0.314	-0.248

*The elements in these two matrices are here reported to only three decimal places although actual calculations were carried five places throughout.

in the primary factor pattern matrix, on the other hand, define the separate patterns and degree of involvement of these variables in the patterns. The pattern matrix shows that the age related discrepancies form one cluster, more or less ia the same manner as they do in the first principal axis. Thus, the first oblique factor can be identified as inconsistency in reporting age-related data. It is not possible to identify this factor as a generalized tendency because the first five variables have almost zero involvement with it.

The second oblique factor is defined by discrepancies with respect to number of children, both male and female. The third and fourth oblique factors are not clear-cut common factors. They are rather specific in mature. Whereas the .third oblique factor is defined by discrepancy scores in reporting .pregnancies, the fourth one can be interpreted as a tendency for discrepancy in reporting educational qualification of spouse.

The loadings on the primary factor structure matrix also show that test-retest discrepancy with respect to spouse's education correlates substantially with the last oblique factor. The structure .matrix also shows that a relatively small loading on the third factor appeared for discrepancy relating to age. However, the pregnancy discrepancy showed the highest correlation with the third factor. Thus, the interpretation of the factors on the basis of the structure matrix remains more or less the same as the one previously arrived at from tha pattern matrix.

Intercorrelation among Primary Factors

The correlation matrix between oblique factor patterns found through oblique rotations is displayed in Table 6. It shows that the first oblique factor has almost zero correlation with the second and third factors. This result is significant in view of the fact that the quartimin solution has "too Oblique" a bias. Thus, the zero correlations between first primary factor on the one hand and the second and third 'primary factors on the other hand indicate real orthogonality. The second and third oblique factors are, however, to some extent correlated with each other, thus suggesting that the discrepancy in reporting the number of children might be related to discrepancy in pregnancy reporting. Both these oblique factors also show almost a zero correlation to the fourth oblique factor. The first

TABLE 6-INTERCORRELATIONS AMONG FOUR PRIMARY FACTOR PATTERNS FOUND TH ROUGH OBLIQUE ROTATION

Code	*Primary Factor Pattern*	*Primary Factor Pattern*			
		A	*B*	*C*	*D*
A.	Age-related Discrepancy	1.00			
B.	No. of Children Discrepancy	.05	1.00	Symmetric	
C.	Discrepancy in Reporting Pregnancy	- .01	.21	1.00	
D.	Discrepancy in Reporting Education	.25	- .03	.05	1.00

oblique factor also shows a non-zero correlation with the last oblique factor. Thus, two orthogonal second-order factors rather than one general factor may emerge if the factor correlation matrix itself is subjected to factor analysis. This finding along with the ones discussed previously totally negate the hypothesis that there is a general attribute of response-inconsistency set. The tendency to report discrepantly from time to time appears to be very much question-specific.

Discussion

The results of this exercise clearly reveal that there is no single attribute which can be interpreted as a generalized tendency to be inconsistent. The notion of a generalized tendency to give inconsistent responses assumes that the respondents will manifest this tendency in any situation irrespective of the nature of questions asked. A particular item content is unimportant. The hypothesis that an individual who tends to respond inconsistently to a given question is likely to be inconsistent on another question of any type, irrespective of its content, has important methodological implications. However, the present study shows little support for such a universal law. Indeed, it will be quite reasonable to suspect such universal rules of human behaviour, having learned through hard experience that psychological processes are usually much more complex than such simplistic notions would suggest. With regard to tendency to agree or 'yeasaying' a similar conclusion is possible since the search for a general acquiescence set has been futile (Schultz and Foster, 1963; Rorer, 1965). One cannot be also sure about the degree to which the tendency to choose extreme view points (extremity set) will be similarly manifested in different attitudinal type questions (Forehand, 1962; Schultz and Foster, 1963).

Rejection of the Generality Hypothesis

Our findings provide strong evidence against the generality hypothesis in one of its simplest forms, the tendency to respond inconsistently from one to another occasion is unidirectional and associated across diverse measures. They do not also lend support to a slightly modified hypothesis that response inconsistencies are less than completely general in the sense that they are all associated with each other in the population of individuals. Instead they provide a strong indication that persons who respond inconsistently to a particular question will *probably* be inconsistent on questions which are basically similar in nature[5] but not on other questions differing in content. Thus persons responding discrepantly about age, for example, will probably give discrepant responses in the same direction also with respect to his or her age at marriage as well as age at consummation of marriage but not necessarily with regard to the number of living children. The present study, therefore, sets the limiting condition under which the inconsistent response tendency might be said to hold. More studies, however, are needed to support the proposed hypothesis of multi-dimensionality of response inconsistencies arising from consistent individual differences in responding discrepantly to different classes and types of questions, wordings in the questions and style of questioning as well as other response determinants.

An Alternative Interpretation

Instead of invoking a generalized tendency to be sheer careless in responding (Sechrest and Jackson, 1962) and postulating the existence of some kind of personality style (Jackson and Messick, 1958), the findings reported here can be explained by the fact that an individual responds randomly or carelessly to a set of related questions as he does not know the answer to the central question. Thus, the 'set' to guess or readiness

5. For example, the level of respondent's education and that of his/her spouse. The two variables show a correlation of 0.209 in the present study. Similarly, the number of male children and number of female children.

to provide an answer on the basis of best guess when in doubt (chance response tendency) seems to be a better explanation for the intercorrelations among test-retest discrepancy scores. Such specific and incidental sources of errors also explain the differential test-retest reliabilities of measures based on factual data. The 'set' to give inconsistent responses may be considered as a way of responding under uncertainty and this point of view has a number of important implications. Firstly, such a tendency will be operative only when the answer to a particular question is not known. Secondly, such inconsistent tendencies may be subsumed under the general rubric of 'response set' conceptualized as a way of interpreting an ambiguous situation (Cronbach, 1950). If this is so, then appropriate alternations in the question content or suitable change in instructions to reduce the ambiguity of the question should markedly minimize the influence of this type of response set. Such methodological refinements in the questioning techniques afe necessary even for factual demographic data collection because the presence of response sets can invalidate or at least sufficiently mask the obtained data so as to leave them ambiguous or uninterpretable.

Some Implications

The test-retest discrepancy with respect to most age-related data arises from the fact that many respondents in rural areas are not certain of their age. Because of this uncertainty different responses are given on different occasions by such uncertain respondents, not only about their chronological age (which changes with the passage of time) but also about their age at marriage or age at consummation of marriage and other such age-related data. Perhaps the most important way to minimize the tendency on the part of the respondent to give discrepant age-related data is to help the respondent whenever possible by referring to suitable landmarks in the historical calendars of local events. Relatives and other third persons may be also asked about the age of the respondent. Thus a good deal of interviewing time and better quality of interviewer training are necessary in order to cope with the problems pertaining to collection of age-related data (Caldwell, 1973, p. 11).

The present study specifically showed that the tendency to report discrepant age-related data (oblique factor one) bears no relationship with the tendency to report discrepant number of children at home. Thus respondents, not age conscious and so responding carelessly about their age, are not necessarily inaccurate or discrepant in reporting other types of data. This rinding provides some consolation, but not a great deal. The message for future research is therefore clear. Should we regard the response inconsistency scores or test-retest discrepancy scores on a set of independent questions as random errors or as systematic errors due to certain uniformities or systematic elements involved in the method of data collection ? Irrespective of whether they are random or not, what control should be exercised in order to minimize the incidence of such errors so that the validity of the questions asked for such data collection remains unsuspected ?

Our findings show that the response inconsistencies with respect to unrelated questions (such as, educational level and number of children in the household) are more or less uncorrelated. The classical notion of random errors also assumes that the error factor in one set of fallible scores is uncorrelated with that in another set. Thus, there is some indication that the response inconsistency scores examined here might be random errors. The second important implication of the findings is that it would be more meaningful to study response inconsistency or response consistency with respect to a particular type of datum rather than searching for a generalized tendency for being inconsistent while responding to any type of questions. Thus, we should talk about response inconsistencies (plural) rattier than response inconsistency (singular). In view of the multidimensional nature of the concept, it is also meaningless to use for statistical analysis a single score of response inconsistency based on the number of times a respondent has been inconsistent with respect to different types of questions. Such composite scores cannot be interpreted unambiguously. It would be erroneous to interpret that a general response in-consistency factor runs through these composite scores based on the aggregate of the different question-specific inconsistencies since this would imply that all response inconsistencies are correlated, which certainly is not the case as is shown by the present study.

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